The step difference in k-value changes over the range of NRF values. At low NRF values for example between 0 and 0.8 dB, k changes by 0.0918, whereas at high NRF values such as between NRF = 11.2dB and 12dB, the step difference in the k-value is $\delta_k =$ 0.0223. The equivalent total number of quantization steps (in a linear quantization) becomes $1/\delta_k = 45$, which corresponds to a virtual quantization of 5.5 bits. Therefore, the non-linear compression function allows a greater virtual quantization than a straightforward linear quantization, thereby reducing memory storage requirements whilst preserving good perceptual quality of the video signal image.

A method and apparatus have been described which enable compression of a control signal that is applied during processing of a video signal. Advantageously, memory storage requirements are reduced, leading to reduced hardware costs and faster signal processing. Also, a video signal processing method and apparatus have been described which take advantage of the compression method and apparatus. The preferred embodiment of the invention has been described using the example of a noise reduction circuit, but the invention is applicable to compression of a luminance-derived control signal used in many other forms of video signal processing.

It should be noted that the above-mentioned embodiments illustrate rather than limit the invention, and that those skilled in the art will be able to design many alternative embodiments without departing from the scope of the appended claims. In the claims, any reference signs placed between parentheses shall not be construed as limiting the claim. The word "comprising" does not exclude the presence of elements or steps other than those listed in a claim. The word "a" or "an" preceding an element does not exclude the presence of a plurality of such elements. The invention can be implemented by means of hardware comprising several distinct elements, and by means of a suitably programmed computer. In the device claim enumerating several means, several of these means can be embodied by one and the same item of hardware. The mere fact that certain measures are recited in mutually different dependent claims does not indicate that a combination of these measures cannot be used to advantage.

luminance-derived control signal is preferably applied on a pixel by pixel basis to the luminance component. However, the average of the luminance-derived control signal is determined over a predetermined area, for use when processing the chrominance components, due to the lower sensitivity. In one preferred embodiment, the luminance-derived control signal is averaged over a 2x2 pixel area, reducing data storage requirements by a factor of 4.

Preferred features of the method and apparatus of the present invention will be apparent from the statements above and the description which follows.

BRIEF DESCRIPTION OF THE DRAWINGS

For a better understanding of the invention, and to show how embodiments of the same may be carried into effect, reference will now be made, by way of example, to the accompanying diagrammatic drawing which shows a schematic overview of a display apparatus comprising a video signal processing circuit employed in a preferred embodiment of the present invention.

DESCRIPTION OF PREFERRED EMBODIMENTS

Referring to the drawing, it is desired to remove noise from a video signal using a noise filter 10. Suitably, the noise filter 10 is a recursive filter. The filter circuit 10 operates sequentially on a luminance component (Y) and then the chrominance components (U/V) of a video signal to produce respective noise filtered signals Y' and U'/V'. The noise filter 10 is controlled by a control circuit 20. The control circuit 20 determines the level of noise reduction applied by the noise filter 10. The level of noise filtering applied by the noise filter 10 is adapted according to the level of motion in the video signal. For example, it is desired to reduce noise filtering applied to areas of the video signal image having motion, in order to preserve image quality and avoid introducing additional artefacts like motion blur. By contrast, it is desired to increase noise filtering in areas of the image having relatively low motion. Therefore, the control circuit 20 generates a control signal (k_lum) derived from the luminance component (Y) representing the level of temporal changes at a particular position in the image. The control signal is often referred to as motion detection signal or a luminance-derived noise reduction control signal. The control signal (k_lum) is used immediately for luminance processing, and is stored in a background memory 30 for the